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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,916	08/20/2001	Kunihiro Mitsutake	03180.0285	4340

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EXAMINER	
BARAN, MARY C	
ART UNIT	**PAPER NUMBER**
2857	

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No.	Applicant(s)	
	09/931,916	MITSUTAKE ET AL.	
	Examiner	Art Unit	
	Mary Kate B Baran	2857	

-- Th MAILING DATE of this communication appears on th cover she t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *14-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-22* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

I. The species best illustrated by claims 1-12.

II. The species best illustrated by claim 14.

III. The species best illustrated by claims 15 and 18-21.

IV. The species best illustrated by claim 16.

V. The species best illustrated by claim 17.

VI. The species best illustrated by claim 22.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 13 is generic to groups I – VI and shall be examined in any case.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. During a telephone conversation with Richard Burgujian on 6 February 2004 a provisional election was made without traverse to prosecute the invention of searching for clustering imperfect entities, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 5 and 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman et al. (U.S. Patent No. 5,240,866) (hereinafter Friedman) in view of Atchinson et al. (U.S. Patent No. 6,393,602) (hereinafter Atchinson).

Referring to claims 1, 10 and 13, Friedman teaches a method of searching for clustering imperfect entities (see Friedman, column 3 liens 51-56), comprising: entering data on imperfect entities present in a search target (see Friedman, column 3 lines 57-64); and searching for clustering imperfect entities according to weights of the discrete distribution functions on the frequency distribution (see Friedman, column 4 lines 28-35). Friedman does not teach calculating a frequency distribution of the imperfect entities in unit cells divided from the search target and approximating the frequency distribution by overlaying at least two discrete distribution functions.

Atchinson teaches calculating a frequency distribution of the imperfect entities in unit cells divided from the search target (see Atchinson, column 6 lines 56-61) and approximating the frequency distribution by overlaying at least two discrete distribution functions (see Atchinson, column 9 lines 38-41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Friedman to include the teachings of Atchinson because calculating a frequency distribution would have allowed the skilled artisan to prioritize the various defects according to limits (see Atchinson, column 9 lines 41-43).

Referring to claims 2 and 11, Friedman teaches entering data on imperfect entities comprises entering the number of imperfect entities in each of the unit cells and entering criterial conditions for the weights of the discrete distribution functions (see Friedman, column 4 lines 28-40); and searching for clustering imperfect entities comprises searching for clustering imperfect entities according to the criterial conditions (see Friedman, column 4 lines 61-67).

Referring to claim 4, Friedman teaches detecting imperfect entities present in the search target (see Friedman, column 3 lines 57-64); storing coordinates of the detected imperfect entities (see Friedman, column 5 lines 32-39); and converting the coordinates of the detected imperfect entities into the numbers of imperfect entities in the unit cells divided from the search target (see Friedman, column 5 lines 46-55).

Referring to claims 5 and 12, Friedman teaches entering the numbers of imperfect entities present in the unit cells divided from the search target and coordinates of the unit cells on the search target (see Friedman, column 3 lines 57-60); and searching for clustering imperfect entities comprises calculating, as a clustering faults threshold, the number of imperfect entities that equalizes components of the discrete distribution functions with each other (see Friedman, column 4 lines 28-40) and searching for every unit cell involving imperfect entities whose number is greater than the clustering faults threshold (see Friedman, column 4 lines 17-24).

Referring to claim 7, Friedman teaches detecting imperfect entities present in the search target (see Friedman, column 3 lines 57-64); storing coordinates of the detected imperfect entities (see Friedman, column 5 lines 32-39; and converting the coordinates of the detected imperfect entities into the numbers of imperfect entities in the unit cells divided from the search target and coordinates of the unit cells (see Friedman, column 5 lines 46-55).

Referring to claim 8, Friedman teaches that the imperfect entities include electrical faults (see Friedman, column 3 lines 21-29).

Referring to claim 9, Friedman teaches that the imperfect entities include defects (see Friedman, column 3 lines 21-29).

4. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman et al. (U.S. Patent No. 5,240,866) (hereinafter Friedman) in view of Atchinson et al. (U.S. Patent No. 6,393,602) (hereinafter Atchinson) and further in view of Ikota et al. ("Discrimination of Clustered Defects on Wafers Using Statistical Methods") (hereinafter Ikota).

Referring to claim 3, Friedman further teaches entering a threshold weight to test the weight of the discrete distribution (see Friedman, column 4 lines 30-34); and searching for clustering imperfect entities comprises determining the presence of clustering imperfect entities if the weight is greater than the threshold weight and no

presence of clustering imperfect entities if the weight of the is equal to of smaller than the threshold weight (see Friedman, column 4 lines 17-24), but does not teach that the discrete distribution functions include a Poisson distribution and a negative binomial distribution.

Atchinson teaches that the discrete distribution functions include a Poisson distribution and a negative binomial distribution (see Ikota, page 53, "3. Method of distinguishing clustered defects" lines 6-8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Friedman and Atchinson to include the teachings of Ikota because a Poisson distribution would have allowed the skilled artisan to obtain a distribution most equivalent to the real data (see Ikota, page 53, "Conclusions", lines 2-3).

Referring to claim 6, Friedman further teaches that calculating a clustering faults threshold comprises calculating the number of imperfect entities that equalizes components of the discrete distributions (see Friedman, column 4 lines 17-24), but does not teach that the discrete distribution functions include a Poisson distribution and a negative binomial distribution.

Atchinson teaches that the discrete distribution functions include a Poisson distribution and a negative binomial distribution (see Ikota, page 53, "3. Method of distinguishing clustered defects" lines 6-8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Friedman and Atchinson to include the teachings of Ikota because a Poisson distribution would have allowed the skilled artisan to obtain a distribution most equivalent to the real data (see Ikota, page 53, "Conclusions", lines 2-3).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Kulkarni et al. teach detecting groups of defects in semiconductor feature space.

(b) Ling et al. teach a real-time in-line defect disposition and yield forecasting system.

(c) Mori teaches prioritizing efforts to improve semiconductor production yield.

(d) Brecher et al. teach an automated defect classification system.

(e) Kiyasu et al. teach a method of and apparatus for inspection of external appearance of a circuit substrate, and for displaying abnormality information thereof.

(f) Keown et al. teach an individualized prepackage AC performance testing IC dies on a wafer using DC parametric test patterns.

(g) Larson et al. teach a method of reducing dice testing with on-chip identification.

(h) Kobayashi et al. teach a process for manufacturing a semiconductor integrated circuit device.

(i) Wen et al. teach possibilistic-diagnosis theory for fault-section estimation and state identification of unobserved protective relays using tabu-search method.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number is (703) 305-4474. The examiner can normally be reached on Monday - Friday from 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (703) 308-1677. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MKB

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